Presentation 2.8: Program for the conversion of Russian municipal boilers with 20MW maximum capacity to biofuel due to funds from the emissions reduction units sell, under the Kyoto Protocol

Andrey Alexandrovich Benin
Deputy of the Russian Federation State Duma
Committee on Natural Resources, Russian Federation State Duma

E-mail: klishko@lemo.ru

Abstract

Energy sector is one of the main industrial sectors influencing a country economy state. The vexed problem existing in Russia is the significant consumption of fixed capital because of the long-term lack of investments needed. This problem is much more vital for the municipal boilers located in some remote areas. The fact that sites of fuels consumption are at the long distance from those of their processing is considered as disadvantage whereas the source of power, the wood can be found nearby. It is feasible to use annually 34m tons of logging wastes in Russia and yet they have not been used so far.

In order to solve these problems we have developed the program for the conversion of boilers to biofuel using the procedures of the Kyoto Protocol. According to the developed mechanism, a state agency is to be established. When the reconstruction is fulfilled and the boilers start the state agency gets emissions reduction units, has them confirmed, sums them up and sells to a foreign customer.

Realization of the program for the boilers conversion to wood chips shall make it possible to reconstruct up to 9362 boilers with 18724 MW aggregate capacity. The boilers reconstruction costs (for the conversion to wood chips) shall be equal to 1872,34m Euro according to the preliminary estimation. They shall be completely paid off due to 696,1m tons CO2 emissions sell. There can be some variants of development depending on the emissions reduction units price. At the price of 12 Euro per 1 ton CO2 the pay-off period shall amount to 3 years and the earnings shall equal to 8353,31m Euro whereas the revenue expected (not including the reconstruction costs) shall amount to 6480,98m Euro. More pessimistic scenarios imply longer pay-off period.

The Member of the Russian Federation State Duma,

Benin Andrey Alexandrovich

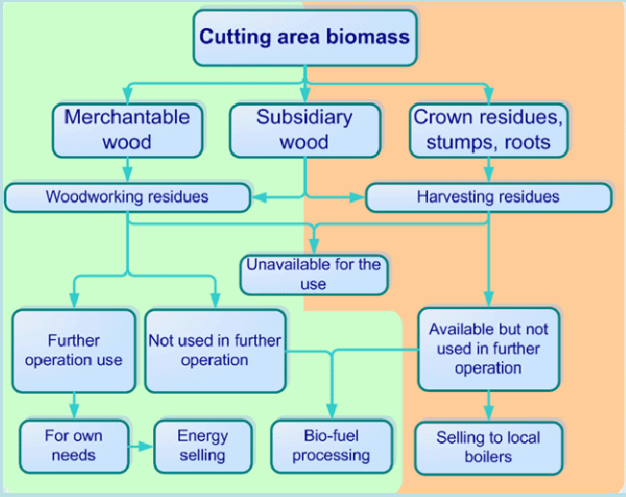
Realization of the Program on Russian boilers with 20 MW maximum capacity conversion to wood chips

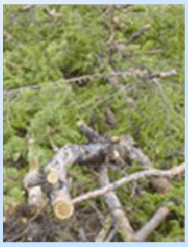
Due to funds from the emissions reduction units sell, under the Kyoto Protocol

Russian municipal heat energy economy in XXI century

- High consumption of basic and service equipment
- Low efficiency of equipment operation
- Challenges in maintenance and modernization of out-of date equipment
- Increasing heat deficit
- Distance between places of fuel resources processing and places of consumption

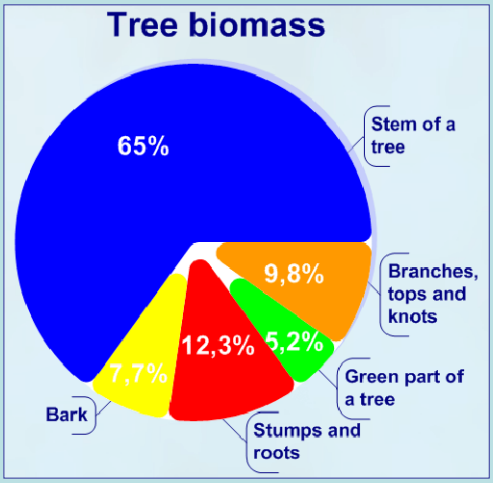
Sources of secondary raw materials and residues of the forest products industry





Recoverable wood resources and residues being perfect raw-materials for heat energy branch have the significant potential

Structure of the forest fund biomass



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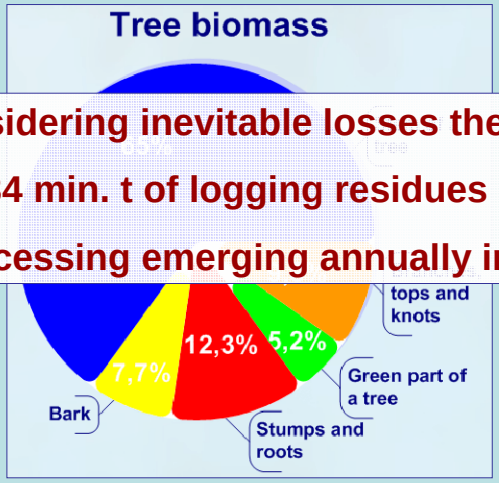
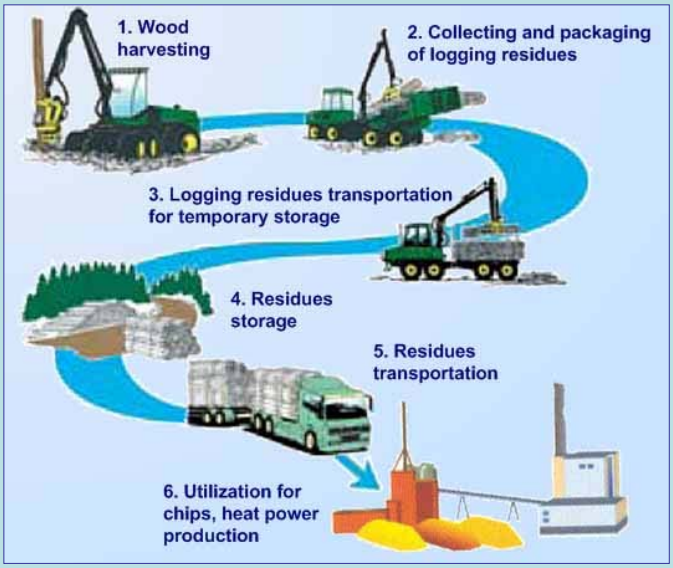
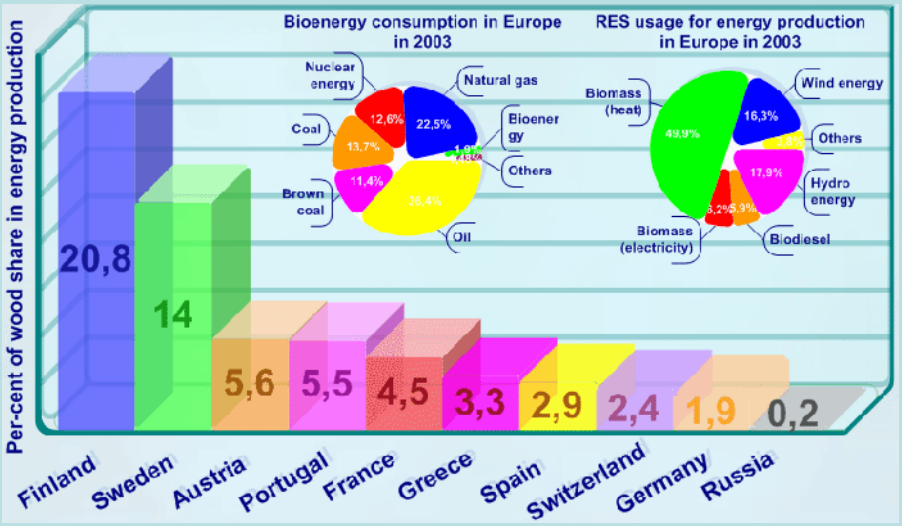


Considering inevitable losses there are appr. 34 min. t of logging residues suitable for processing emerging annually in Russia

Chip processing technology chain



Bioenergy use in European countries



Russian producers of boilers operating wood-fuel

№	Manufacturer	Number of models of MW capacity							Total
		<0,5	0,5-1	1-1,5	1,5-2	2-2,5	2,5-3	>3	
1	CJSC "Petrozavodskmash"								3
2	CJSC "Heat supply systems"								1
3	CJSC "SOYUZ"								17
4	Krasnoyarsk University of Applied Physics								2
5	OJSC "Baltkotlomash"								6
6	OJSC "BZEM" (Energomash)								1
7	OJSC "Biyskenergomash"								3
8	OJSC "Bryansksantekhnika"								8
9	OJSC "Dorogobuzhkotlomash"								1
10	LLC "Izhevsk boiler plant"								3
11	LLC "KAMI-Stankoagregat"								8
12	LLC "Mechanical plant of Kirishi"								6
13	LLC "Kovrovsky boilers"								11
14	LLC "Kusinsky casting and mechanical plant"								1
15	CAM "Spetsmontazh"								11
16	SESMP TEPLOUNIVERSAL								4
	Total	30	25	14	6	4	3	4	86

Range of models of relevant capacity:
small (<2 units) | mecium (2-3 units) | large (> 3 units)

According to the data based on inquiry March 01-31,2006

Boiler reconstruction in Krasnoozernoye settlement, Leningrad oblast

Total operation cost: 3.3 mln. roubles.
Reconstruction period: 3 months
Basic results:

- Increased boiler's efficiency factor from 50-55% to 80-85%,
- Increased dependability of heat supply,
- solving the problem of settlement heat supply.

List of operations done:

- installation of 2 wood chip boilers of 1 MW each,
- maintenance and replacement of pump equipment,
- installation maintenance and replacement,
- electrical facilities checkout,
- boiler maintenance,
- fuel storage and feed system.

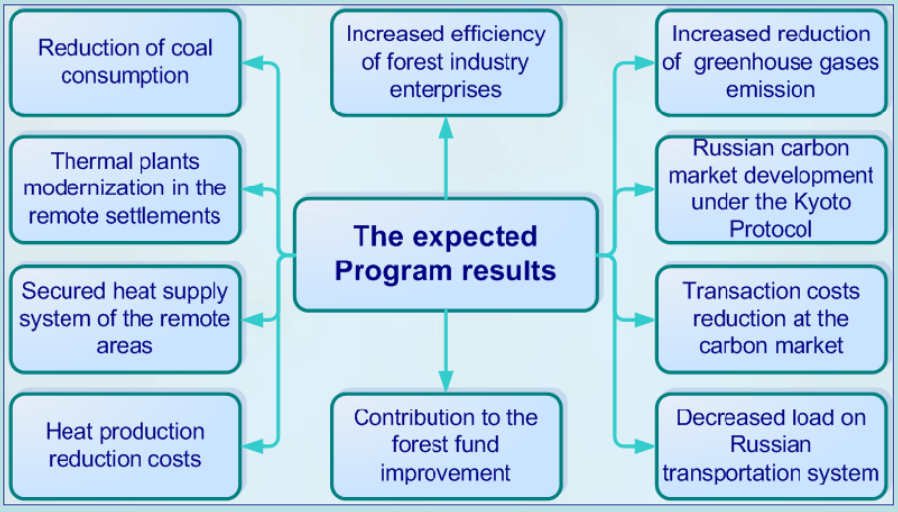
Boiler reconstruction in Shpankovo settlement, Leningrad oblast (4 MW)

№ п/п	Costs	Estimated cost, US dollars				Total estimated cost, US dollars
		construction operations	assembly operations	equipment	other costs	
1.	Preliminary work (geodesic survey)				96	96
2.	Woodchip boiler construction in Shpankovo settlement	206 552	35 463	212 357		454 372
3.	Exterior heating systems	22 566				22 566
	Exterior water-supply systems	10 214				10 214
	Domestic sewage	2 625				2 625
	Exterior electricity grids	28	4 347			4 375
	Provision of urban amenities	23 216				23 216
4.	Costs for temporary constructions and buildings 1,6%	4 243	637			4 880
	including refunds 15%	637	96			732
5.	Supplementary costs for operating in winter period 1,5%	4 041	607			4 648
6.	Other costs				14 792	14 792
7.	Project operations				24 074	24 074
8.	Emergent operations reserve 3%	8 204	1 231	6 371	1 169	16 976
	Total costs acc. to consolidated estimation	**281 689**	**42 285**	**218 728**	**40 131**	**582 833**

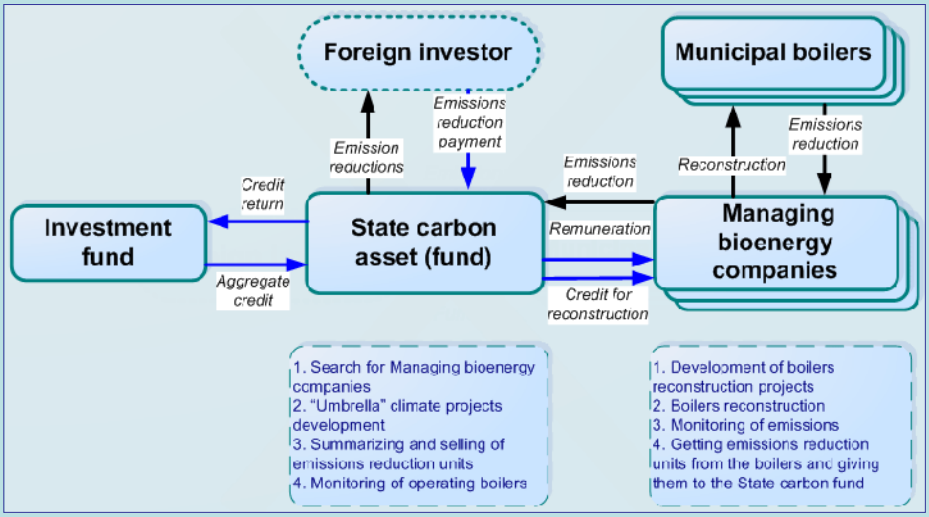
Implementation of the Program on Russian boilers fuel conversion to the wood chips

- The number of boilers to be reconstructed: 9 362 with the capacity of 2 MW each
- Total capacity of the boilers to be reconstructed: 18 724 MW
- Total reconstruction expenditures: 1 872,34 mln. Euro
- Avoided emissions in CO_2 equ: 696,1 min.t

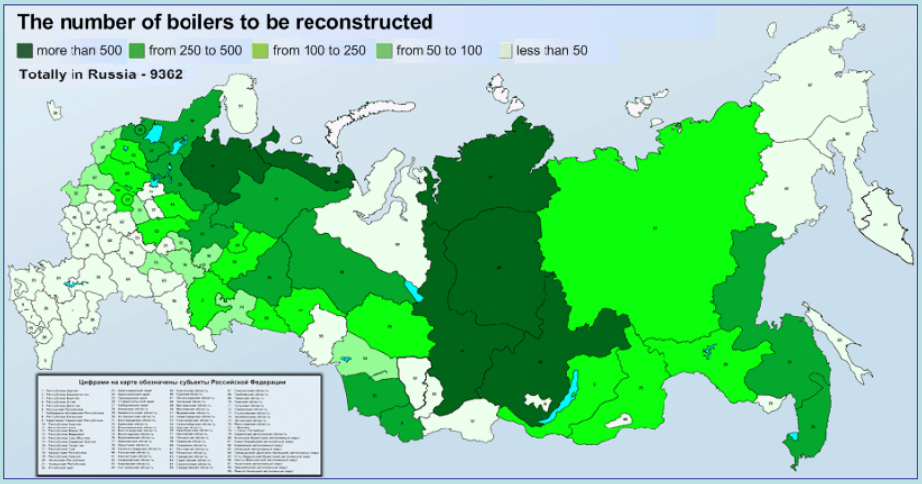
The expected program results



Mechanism of the Program realization



The program spatial extent



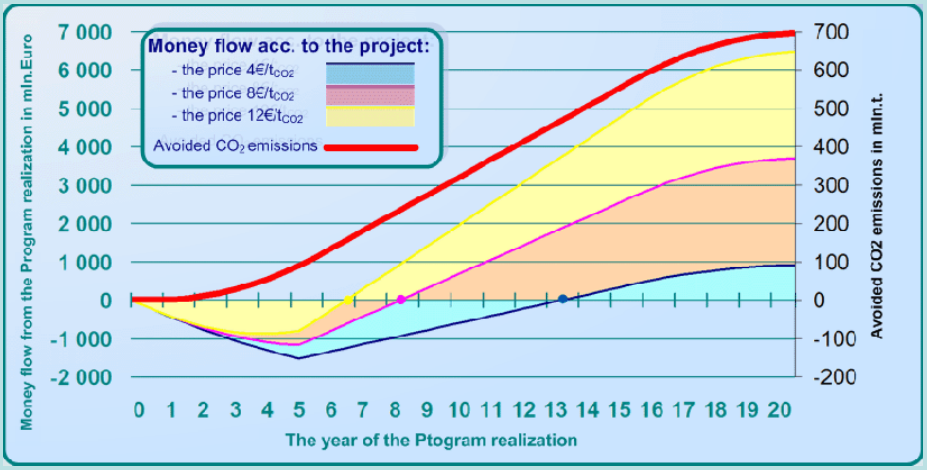
Financial results of a boiler of 2MW maximum capacity conversion to biofuel

Capacity of the boiler being reconstructed 2 MW
Reconstructure expenditures: 200 000 Euro.
Reconstruction total pay-off period: less than 3,4 years
Emissions avoided: 74,4 T.T. CO_2 equivalent.

Financial indicators of a boiler reconstruction considering various ERU prices in mln. Euro.

Assets	4€/tCO_2	8€/tCO_2	12€/tCO_2
Reconstruction costs	200,00	200,00	200,00
Emissions trading earnings	297,00	595,00	892,00
Revenue expected	97,00	395,00	692,00
Pay-back terms	10 years	5 years	3,4 years

The program pay-off period for 9 362 boilers conversion to wood chip



Financial results of the Program

9 362 boilers of 2 MW with aggregate capacity 18 724 MW are being reconstructed

Reconstruction expenditures: 1 872,34 mln.Euro

Program total pay-off period: from 6,5 years

Emissions avoided: 696,1 mln.t CO_2 equivalent

The Program efficiency considering various ERU prices in mln.Euro.

Assets	4€/tCO_2	8€/tCO_2	12€/tCO_2
Reconstruction costs	1 872,34	1 872,34	1 872,34
Crediting funds required	1 515,43	1 158,53	874,55
Emissions trading earnings	2 784,44	5 568,88	8 353,31
Revenue expected	912,10	3 696,54	6 480,98
Pay-back terms of the Program	13,5 years	8,5 years	6,5 years

Financial results of boilers operating coal conversion to wood chip in some regions of Russia

Indicator	Measure-ment unit	Karelia	Komi	Novgorod oblast	Arkhangelsk oblast
Reconstruction costs	Euro	14 246 130	26 563 934	8 854 927	91 763 548
Emissions avoided	t_{CO2}/year	542 104	530 440	280 056	1 192 216
Emissions reduction units selling earnings, at the price of:					
4Euro/tCO2	Euro/year	2 168 416	2 121 759	1 120 225	4 768 864
8Euro/tCO2	Euro/year	4 336 833	4 243 518	2 240 450	9 537 728
12Euro/tCO2	Euro/year	6 505 249	6 365 276	3 360 675	14 306 592
Pay-off period, at the price of:					
4Euro/tCO2	years	7	13	8	19
8Euro/tCO2	years	3	6	4	10
12Euro/tCO2	years	2	4	3	6

Thank you for your attention!

Contacts:

198097 St. Petesbourg, Prospekt Stachek 47 “E”
Tel. +7 (812) 3039293
Fax. +7 (812) 3039281
E-mail: benin@lemo.ru

BENIN ANDREY ALEXANDROVICH